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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/988,934	11/19/2001	Christopher J. Orlick	MATP-613US	9363

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EXAMINER

TRAN, TRANG U

ART UNIT PAPER NUMBER

2622

DATE MAILED: 06/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/988,934

Applicant(s)

ORLICK, CHRISTOPHER J.

Examiner

Trang U. Tran

Art Unit

2622

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 April 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 15-28 is/are allowed.
- 6) ☒ Claim(s) 1,7-13,29 and 30 is/are rejected.
- 7) ☒ Claim(s) 2-6 and 14 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicant's arguments filed April 20, 2006 have been fully considered but they are not persuasive.

In re page 15, applicant argues that the rejection of claims 29-30 under 35 U.S.C 101 for being directed to a recording medium storing nonfunctional descriptive material is overcome by amending claims 20 and 30 to be dependent on claim 1. Claim 1, being a valid method claim, is by definition functional. Thus, any recording medium containing computer program instructions that cause a computer to perform the method of claim 1 must be a recording medium that includes functional descriptive material.

In response, the examiner respectfully disagrees. It is noted that claims 29-30 recite "A computer readable carrier..." It is further noted that "A computer readable carrier..." can be broadly interpreted as "air". Data structures not claimed as embodied in computer-readable media are descriptive material per se and are not statutory because they are neither physical "things" nor statutory processes. When "A computer readable carrier" of claims 29-30 is interpreted as "air", claims 29-30 are nothing more than computer program instructions are data structures per se and are not statutory because they are neither physical "things" nor statutory processes.

2. Applicant's arguments with respect to claims 1, 11-13 and 29 have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Rejections – 35 USC § 101***

3. 35 U.S.C. 101 reads as follows:

Art Unit: 2622

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. Claims 7-10 and 29-30 are rejected under 35 U.S.C. 101 because claims 7-10 are directed to mathematical algorithm without practical application and claims 29-30 are directed a computer readable carrier including computer program instructions.

Regarding claims 7-10, "Phenomena of nature, though just discovered, mental processes, abstract intellectual concepts are not patentable, as they are the basis tools of scientific and technological work." Benson, 409 U.S. at 67, 175 USPQ at 675. One may not patent a process that comprises every "substantial practical application" of an abstract idea, because such a patent "in practical effect would be a patent on the [abstract idea] itself." Benson, 409 U.S. at 71-72, 175 USPQ at 676; cf. Diehr, 450 U.S. at 187, 209 USPQ at 8 (stressing that the patent applicants in that case did "not seek to pre-empt the se of [an] equation," but instead sought only to "foreclose from others the use of that equation in conjunction with all of the other steps in their claimed process"). "To hold otherwise would allow a competent draftsman to evade the recognized limitations on the type of subject matter eligible for patent protection." Diehr, 450 U.S. at 192, 209 USPQ at 10. Thus, a claim that recites a computer that solely calculates a mathematical formula (see Benson) or a computer disk that solely stores a mathematical formula is not directed to the type of subject matter eligible for patent protection.

Claims 7-10 recite a manipulation of basic mathematical constructs comprising the steps of "determining a first gradient intensity value in a first direction ..."; "determining a second gradient intensity value in a second direction..."; "determining if

at least one of the first magnitude ...”; “if the target pixel location ..”; “selecting one coefficient set from among ...”; “multiplying each one-bit ...”; “summing the plurality of results...” of claim 7; “wherein the step of comparing the first and second gradient intensity values...” of claim 8; “comparing the first and second gradient intensity value...” of claim 9; “generating an edge map including a plurality ...”; “filtering the edge map using first and second ...”; and “determining the angle of the edge at ...” of claim 10 without Practical Application is not a patentable invention because “it is now commonplace that an application of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection.” Diehr, 450 U.S. at 187, 209 USPQ at 8 (emphasis in original); accord Flook, 437 U.S. at 590, 198 USPQ at 197; Benson, 409 U.S. at 67, 175 USPQ at 675. Thus, “while a scientific truth, or the mathematical expression of it, is not a patentable invention, a novel and useful structure created with the aid of knowledge of scientific truth may be.” Diehr, 450 U.S. at 188, 209 USPQ at 8-9 (quoting Mackay, 306 U.S. at 94); see also Corning v. Burden, 56 U.S. (15 How.) 252, 268, 14 L.Ed. 683 (1854) (“It is for the discovery or invention of some practical method or means of producing a beneficial result or effect, that a patent is granted...”). Claims 7-10 also seek to pre-empt the use of an equation.

Regarding claims 29-30, data structures not claimed as embodied in computer-readable media are descriptive material per se and are not statutory because they are neither physical “things” nor statutory processes. See, e.g., Wamerdam, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory). Merely claiming nonfunctional descriptive material stored in a computer-readable medium does

not make it statutory (see MPEP 2106.IV.b.1). When the claimed "a computer readable carrier" of claims 29-30 are interpreted as "air", claims 29-30 are nothing more than computer program instructions which are descriptive material per se and are not statutory.

***Claim Rejections – 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1, 11-13 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shin et al. (US patent No. 6,731,342 B2) in view of Acharya et al (US Patent No. 6,229,578 B1).

In considering claim 1, Shin et al discloses all the claimed subject matter, note 1) the claimed if the target pixel location is an edge pixel location, determining a ratio of the first and second gradient intensity values is met by Equation 5 disclosed in col. 8, lines 47-61 (Fig. 3, col. 7, line 58 to col. 8, line 2 and col. 8, lines 47-61), 2) the claimed processing the ratio of the first and second gradient intensity values to determine an approximate angle of the edge is also met by Equation 5 disclosed in col. 8, lines 47-61 (Fig. 3, col. 8, lines 47-61), and 3) the claimed if the target pixel location is an edge pixel location, interpolating a value for the target pixel location from the values of pixels in the interlace scan image adjacent to the target pixel and lying along the determined

approximate angle is met by the spatial interpolator 34 (Fig. 3, col. 7, lines 18-25 and col. 8, lines 47-61).

However, Shin et al explicitly do not disclose the claimed determining a first gradient intensity value in a first direction in a predetermined region about the target pixel position and a first magnitude value for the determined first gradient intensity value, determining a second gradient intensity value in a second direction in the predetermined region about the target pixel position, the second direction being different from the first direction, and a second magnitude value for the determined second gradient intensity value, and determining if at least one of the first magnitude value and the second magnitude value exceeds a predetermined threshold to define the target pixel location as an edge pixel location.

Acharya et al teach that once the localization region is defined, the next step is to determine the gradient value associated with each and every pixel in the localization region by applying some mask or operator (step 120), this mask or gradient operator is applied to a small neighborhood above each pixel, ordinarily with that neighborhood as well being of smaller size than the localization region... whatever the selected threshold value, the gradient (or normalized gradient) is compared against that threshold value (step 140), if the gradient (or normalized gradient) exceeds the threshold value, the corresponding pixel can be classified as an "edge" pixel which is a pixel that belongs to a edge feature of the image such as a line, if not, the pixel is classified as a non-edge pixel... and the gradient operation is used in edge detection since it is assumed that an edge has a particular direction within the image space, the pixels along the side

boundary (one side-I0, I3, I6 and another side-I2, I5, I8) of the pixel should have a strength or relative combined intensity level less than the pixel I4 itself if I4 is to be considered an edge pixel, the image space is in two dimension, vertical and horizontal, two direction differential about the pixel I4 need be computed (Figs. 1 and 2, col. 4, line 27 to col. 7, line 60).

Therefore, it would have been obvious to one ordinary skill in the art at the time of the invention to incorporate the gradient-based edge detection as taught by Acharya et al into Shin et al' s system in order to accurately classifying the pixels of the video image as either edge pixels or non-edge pixels.

In considering claim 11, Shin et al discloses the claimed in which the step of processing the ratio of the first and second gradient intensity values includes the step of applying the tangent value to combinational logic which is configured to approximate the inverse tangent function (Equation 5 disclosed in col. 8, lines 47-61 of Shin et al).

In considering claim 12, Shin et al discloses the claimed wherein the step of processing the ratio of the first and second gradient intensity values to determine the angle of the edge further includes the step of reflecting the edge angle about a predetermined reference angle if the fist magnitude value is greater than the second magnitude value (Equation 5 disclosed in col. 8, lines 47-61).

In considering claim 13, Shin et al discloses the claimed comparing the first and second gradient intensity values and changing the angle of the edge in sense from positive to negative if the first and second gradient intensity values are opposite in sense (Equation 5 disclosed in col. 8, lines 47-61).



Claim 29 is rejected for the same reasons as discussed in claim 1 above and additionally Shin et al discloses a computer readable carrier including computer program instructions (program modules disclosed from col. 10, line 53 to col. 11, line 8 and computer programs disclosed in col. 7, lines 50-54, in col. 10, lines 1-15, in col. 13, lines 34-43, in col. 16, lines 3-13 and lines 25-49, and in col. 18, lines 20-24).

***Allowable Subject Matter***

7. Claims 2-6 and 14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The dependent claim 2 identifies the uniquely distinct features: "calculating a difference value between the larger magnitude value and the other magnitude value; representing as bit strings said first and second magnitude values and the difference value; identifying a most significant non-zero bit position in the bit string representing the larger magnitude value; identifying a bit position in the bit string representing the difference value, the identified bit position corresponding to the bit position identified in the bit string representing the larger gradient intensity value; dividing a binary value at the identified bit position in the bit string representing the difference between said first and second gradient intensity values, and a predetermined number of less significant bit positions, by respective increasing powers of two to produce respective results, and summing the results to produce a sum; subtracting the sum from unity to generate the ratio, wherein the ratio is a tangent value". The prior art, Shin et al. (US patent No.

6,731,342 B2) and Acharya et al (US Patent No. 6,229,578 B1), either singularly or in combination, fail to anticipate or render the above underlined limitations obvious.

8. Claims 15-28 are allowed.

The independent claim 15 identifies the uniquely distinct features: "wherein the combination logic includes: a comparator that compares the first and second magnitude values to identify a larger magnitude value and a smaller magnitude value; a subtractor that subtracts the smaller magnitude value from the larger magnitude value to generate a difference value, wherein at least the larger magnitude value and the difference value are represented as bit-strings; and logic circuitry, coupled to receive the larger magnitude value which identifies a most significant non-zero bit position in the larger magnitude value". The prior art, Shin et al. (US patent No. 6,731,342 B2) and Acharya et al (US Patent No. 6,229,578 B1), either singularly or in combination, fail to anticipate or render the above underlined limitations obvious.

### ***Conclusion***

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Trang U. Tran whose telephone number is (571) 272-7358. The examiner can normally be reached on 8:00 AM - 5:30 PM, Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Ometz can be reached on (571) 272-7593. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TT  
May 30, 2006



Trang U. Tran  
Examiner  
Art Unit 2622